ECE 340 Homework # 1

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1 Problem 1

Solve 5 section 1.2: Out of the students in a class, 60% are geniuses, 70% love chocolate, and 40% fall into both categories. Determine the probability that a randomly selected student is neither a genius nor a chocolate lover.

Solution:
Let G and C be the events that the chosen student is a genius and a chocolate lover, respectively. We have P(G) = 0.6, P(C) = 0.7, and P($G \cap C$) = 0.4. We are interested in P($G^c \cap C^c$), which is obtained with the following calculation:
P($G^c \cap C^c$) = 1-P($G \cup C$) = 1 - (P(G)+P(C)-P($G \cap C$)) = 1-(0.6+0.7-0.4) = 0.1

2 Problem 2

Peter, John and Mary are in a group of 6 students to be seated at random in a row of 6 chairs. Find the probability that Peter, John and Mary will be seated together in consecutive chairs.

Solution:
There are 6! = 720 ways 6 people can sit in a row.
If the Peter, John and Mary are regards as a unit, then we can first order the objects B, G1, G2, G3, where B is the unit of the Peter, John and Mary, and G1,G2,G3 are the other 3 people. There are 4! ways to do this.
Then the Peter, John and Mary can be ordered in 3! ways.
Thus total ways in which Peter, John and Mary can be seated together is 4!3! = 144.
Probability: 144/720= 0.2.